Please amend the specification as follows:

Please amend the title of the specification as follows:

ANTENNA ~~FEEDFORWARD~~ FEEDBACK INTERFERENCE CANCELLATION SYSTEM

Please amend paragraph [0005] of the specification as follows:

[0005] Now referring to Figure 1, a terrestrial system 10 using a known method for interference cancellation in a terrestrial environment is shown. A first antenna 12 is used to receive communication signals 14 from a first source 16 such as a mobile phone. A second antenna 18 is used to receive an interference reference signal 20 from a second source 22 such as a base tower. The communication signal 14 has interference, which is approximately equal to the interference reference signal 20. ~~The communication signal 14~~ An output or desired signal 34 is compared to the interference reference signal 20 to generate an error signal 24 by a correlator [[26]]24. The error signal [[24]]26 is transferred along with the interference reference signal 20 to a controller 28. The controller 28 adaptively cancels the interference on the communication signal 14 by transferring an interference signal 30 into a subtractor 32 to be negatively added to the communication signal 14. The controller 28 iteratively cancels the interference on the communication signal 14 until the error signal [[24]]26 is as small as possible. Notice the interference that is canceled is typically interference created from a different source other than the terrestrial system 10, which is receiving the desired signal.

A1

Please amend paragraph [0011] of the specification as follows:

A2

[0011] The forgoing and other advantages are provided by a method and apparatus of canceling interference on communication signals within a satellite payload. The satellite payload of the present invention receives a communication signal via a first antenna. The first antenna is electrically

coupled to an analog-to-digital converter (ADC). The ADC converts the communication signal into a received signal. The ADC is coupled to a satellite payload circuit having a first input, a second input, and an output. The first input is electrically coupled to the ADC. The satellite payload circuit digitally processes the received signal to form an interference reference ~~feedforward~~ feedback signal. The output is coupled to the second input by a ~~feedforward~~ feedback signal path. The satellite payload circuit transfers the interference reference ~~feedforward~~ feedback signal from the output to the second input via the ~~feedforward~~ feedback signal path.

A2

Please amend paragraph [0012] of the specification as follows:

[0012] A method of adaptively canceling interference on a received signal within a satellite payload using an interference reference ~~feedforward~~ feedback signal is also provided.

Please amend paragraph [0027] of the specification as follows:

[0027] Referring now to Figure 3, a satellite payload system 44 applying interference cancellation in accordance with the present invention is shown. The satellite payload system 44 has a first antenna 52 for receiving a communication signal 54 from a ground based terminal 42. The received communication signal 54 is transferred through an analog-to-digital converter (ADC) 58 to form a received signal 60. The received signal 60 is transferred to a first input 61a of a satellite payload circuit 61. The satellite payload circuit 61 also has a second input 61b, and an output 61c. The satellite payload circuit 61 digitally processes the received signal 60 to form an interference reference ~~feedforward~~ feedback signal 62. The interference reference ~~feedforward~~ feedback signal 62 is transferred through a digital-to-analog converter (DAC) 64 to form a transmit signal 65. The transmit signal 65 is transmitted by a second antenna 66 to ground based terminal 42. The interference reference ~~feedforward~~ feedback signal 62 is also transferred using a ~~feedforward~~ feedback signal path 70 to the second input 61b.

A3

Please amend paragraph [0028] of the specification as follows:

[0028] The satellite payload circuit 61 transfers the received signal 60 through a subtractor 70 to form a desired signal 72. The desired signal 72 is transferred to a digital processor 76 and a correlator 78. The digital processor 76 forms and transfers the interference reference ~~feedforward~~ feedback signal 62 to, the DAC 64, the correlator 78, and a controller 80. The correlator 78 compares the desired signal 72 to the interference reference ~~feedforward~~ feedback signal 62 to generate an error signal 82. The controller 80, based on the error signal 82, adaptively cancels the interference generated from the satellite payload 44 on the received signal 60. The controller 80 transfers a counter-interference signal 84 to the subtractor 70, which is subtracted from the received signal 60 to form the desired signal 72. Arrow 48 illustrates interference imputed onto the communication signal 54 from the transmitted signal 65.

A3

Please amend paragraph [0029] of the specification as follows:

[0029] The digital processor 76 may perform several functions. The digital processor 76 may perform as a digital sample transponder or may perform packet switching through demodulation and rerouting of signals. The high power levels of the generated transmit signals 65 created within the digital processor 76 cause interference on the communication signals 54. In addition to the high power level of the transmit signals 65, a narrow frequency separation between the received communication signals 54 and the transmit signals 65 also causes interference. The digital processor 76 transfers an interference reference ~~feedforward~~ feedback signal 62 to the correlator 78 and the controller 80. By digitally transferring the interference reference ~~feedforward~~ feedback signal 62 to the correlator 78 and the controller 80 the satellite payload 44 has the ability to accurately decipher the generated interference from the communication signal 54. This ~~feedforward~~ feedback design also allows for accurate timing of signals having various frequencies and bandwidth.

Please amend paragraph [0030] of the specification as follows:

[0030] The correlator 78 compares the interference reference ~~feedforward~~ feedback signal 62 to the desired signal 72 to generate an error signal 82. If the frequencies and amplitudes of the interference reference ~~feedforward~~ feedback signal 62 correspond to the frequencies and amplitudes of the desired signal 72 then the error signal 82 is small. The error signal 82 may be a stream of digital data points have varying amplitude, phase, and frequency. The error signal 82 may also be as simple as a magnitude value representing a level of error.

Please amend paragraph [0031] of the specification as follows:

A3

[0031] The controller 80 adaptively cancels the interference on the received signal 60 based on the error signal 82. By using the interference reference ~~feedforward~~ feedback signal 62 the controller 80 is able to better attenuate and cancel the interference. The controller 80 iteratively cancels the interference until the error signal 82 is as small as possible. The controller 80 transfers the counter-interference signal 84 to the subtractor 70, which in turn adds the received signal 60 to the negative of the counter-interference signal 84 to create the desired signal 72.

Please amend paragraph [0032] of the specification as follows:

[0032] Referring now to Figure 4, a satellite payload 84, having multiple feedback signal paths 86, applying interference cancellation in accordance with the present invention is shown. The satellite payload 84 of the present invention is capable receiving and transmitting multiple communication signals. The digital processor 76, the correlator 78, and the controller 80 of the present invention are capable of transferring multiple communication signals simultaneously or sequentially. A system internal clock may be used for timing of the multiple signals. The satellite payload 84 is similar to the satellite payload 44, in Figure 3, except multiple ~~feedforward~~ feedback paths 86 and multiple DACs 64 are used to accommodate for

A3

multiple signal reception and transmission. Also, although not shown, multiple ADCs 58 and subtractors 70 may be used to accommodate for multiple communication signals.

Please amend paragraph [0037] of the specification as follows:

[0037] In step 106, the desired signals 72 are digitally processed to form the interference reference ~~feedforward~~ feedback signals 62.

A4

[Please amend paragraph [0038] of the specification as follows:]

[0038] In step 108, the correlator 78 compares the interference reference ~~feedforward~~ feedback signals 62 to the desired signals 64 and generates the error signals 82.

Please amend paragraph [0040] of the specification as follows:

A5

[0040] The above-described invention, by digitally providing an interference reference ~~feedforward~~ feedback signal to the correlator and controller, accurately eliminates the interference from the received communication signals. The present invention reduces the need for filtering to remove interference. The reduction in the amount of satellite payload components reduces satellite payload mass, increases available space on the satellite payload, and saves on production and launch costs.

Please amend the abstract paragraph [0042] of the specification as follows:

A6

[0042] A method of digitally canceling interference on a received signal 60 within a satellite payload 44 using an interference reference ~~feedforward~~ feedback signal 62 is provided. The satellite payload 44 of the present invention receives a communication signal 54 with interference via a first antenna 52. The communication signal 54 is converted into a received signal 60 and transferred to into a first input 61a of a satellite payload circuit 61. The satellite payload circuit 61 has the first input 61a, a second input 61b, and an output 61c. The output 61c is electrically coupled to the second input

A6

61b by a ~~feedforward~~ feedback signal path 70. The satellite payload circuit 61 adaptively cancels interference on the received signal 60 using an interference reference ~~feedforward~~ feedback signal 62 that is transferred from the output 61c to the second input 61b via the ~~feedforward~~ feedback signal path 70.